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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|-----------------|-------------|----------------------|---------------------|------------------|
|-----------------|-------------|----------------------|---------------------|------------------|

10/702,646

11/07/2003

Tetsuro Tojo

244779US3

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12/06/2011

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1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

DINH, BACH T

ART UNIT

PAPER NUMBER

1724

NOTIFICATION DATE

DELIVERY MODE

12/06/2011

ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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| | | | |
|------------------------------|--------------------------------------|------------------------------------|--|
| Office Action Summary | Application No. 10/702,646 | Applicant(s) TOJO ET AL. | |
| | Examiner BACH DINH | Art Unit 1724 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 October 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ An election was made by the applicant in response to a restriction requirement set forth during the interview on ____; the restriction requirement and election have been incorporated into this action.
- 4) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 5) ☒ Claim(s) 13-22 is/are pending in the application.
- 5a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 6) ☐ Claim(s) ____ is/are allowed.
- 7) ☒ Claim(s) 13-22 is/are rejected.
- 8) ☐ Claim(s) ____ is/are objected to.
- 9) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 10) ☐ The specification is objected to by the Examiner.
- 11) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 12) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. ____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. ____. |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date ____. | 6) <input type="checkbox"/> Other: ____. |

DETAILED ACTION

Summary

1. This is the response to the communication filed on 10/07/2011.
2. Claims 13-22 remain pending in the application.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
5. Claims 13-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tojo et al. (WO 01/77412) with equivalent English translation provided by Tojo et al. (US 6,818,105) in view of Kawai et al. (US 2002/0062845).

The recited limitation "an inert gas substitution means" of claims 13, 17 and 21-22 invoke 35 USC 112, sixth paragraph. According to the specification, the inert gas substitution means includes the inert gas feeding line 91, the inert gas storage tank 92, the

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second automatic valve 73, the first automatic valve 74, and an HF feeding interruption detecting means (see specification on page 6).

Addressing claims 13, 16-17 and 20-22, Tojo discloses a fluorine gas generator for generating fluorine gas by electrolyzing an electrolyte comprising a hydrogen fluoride containing mixed molten salt (col. 14 lines 22-25 or 14:22-25), which generator is equipped with:

A hydrogen fluoride gas feed line (figure 3, HF supply line, 10:64), one end of which is connected to a hydrogen fluoride gas supply source (10:53, the hydrogen fluoride gas is continuously fed; therefore, it is inherent that the hydrogen fluoride gas supply line is connected to a hydrogen fluoride gas supply source) and the other end of which is connected to a hydrogen fluoride gas inlet disposed in an electrolyte in the electrolyte bath (in figures 3-4, the HF supply line has one end or the inlet disposed in the electrolyte 3 in the electrolytic bath; furthermore, in 10:44-48, the HF gas is bubbled in the molten salt; therefore, it is implicitly disclosed that the inlet of the HF supply line is disposed in the electrolyte), for feeding hydrogen fluoride gas into the electrolyte,

A first automatic valve disposed on the hydrogen fluoride gas feed line (10:60-65, solenoid valve),

An inert gas feed line (figure 1, the gas feed lines connected to the inert gas cylinder 18, 7:45-57),

A liquid level detector (10:60, liquid level probe) for detecting the liquid surface level of the electrolyte, wherein the first automatic valve is configured to open to start

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feed of hydrogen fluoride gas when the liquid level detector detects that the liquid surface level of the electrolyte is at or lower than a predetermined level (10:57-65, the solenoid valve is open to supply HF gas when the liquid level detector detects a drop in liquid level), and to close to stop hydrogen fluoride gas feeding when the liquid level detector detects that the liquid surface level of the electrolyte is at or higher than a predetermined level (col. 10 line 65 to col. 11 line 2 or 10:65-11:2, the supply of HF gas causes the liquid level to rise until the liquid surface contacts the liquid level detector, the solenoid valve is closed, which stops the feeding of HF gas). It is further noted that when the solenoid or first automatic valve is closed to stop the feeding of HF gas, the corrosive HF gas still remains in the portion of the HF gas feed line downstream from the first automatic valve.

Tojo further expresses the desire to maintain equal pressure between the anode and cathode chambers in the event of pressure fluctuation due to the clogging of the fluorine gas line or the hydrogen gas line (9:7-10:11, figures 1-6) and in order to prevent possible back flow of the electrolytic bath (3:2-4). This is evidenced from the disclosure in 9:20-51 and figure 3, where the clogging of the fluorine gas line causes pressure in the anode chamber 5 to decrease and the pressure in the cathode chamber 7 to increase, which pushes more electrolyte to the HF feed line as seen in figure 3. Subsequently, inert gas is introduced in order to decrease the liquid electrolyte level in the cathode chamber to match that of the anode chamber. Moreover, Tojo recognizes that HF gas is corrosive (8:1-5). Additionally, Tojo discloses when electrolysis is halted; the inert gas is used to purge the system (9:38-50).

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Tojo is silent regarding the inert gas feed line connected to a downstream side of the first automatic valve on the HF gas feed line and the inert gas substitution means for feeding an inert gas from the inert gas feed line to the HF gas feed line when the first automatic valve is closed.

Kawai discloses a gas supply system comprises a HF feed line (figure 9, the line connected to HF bomb 43) with a valve 45 and an inert gas feed line (figure 9, the line connected to the N₂ bomb 44), which includes one end connected to a downstream side of the valve 45 (figure 9). Additionally, the inert gas is used to purge the HF gas supply system [0089].

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the fluorine gas generator of Tojo by connecting the inert gas feed line to a downstream side of the first automatic valve in the same manner as the inert gas feed line is connected to the downstream side of the valve in the HF gas feed line of Kawai because connecting the inert gas feed line to the downstream side of the first automatic valve allows the purging of corrosive HF gas that remain in the HF gas feed line downstream from the first automatic valve (Kawai, [0089]) as well as preventing back flow of the electrolyte by equalizing the pressure between the anode chamber 5 and the cathode chamber 7 when the pressure of the cathode chamber 7 decreases as shown in figure 3 of Tojo.

With regard to claims 17 and 22, in even in which the liquid level of the electrolyte rises and contact the liquid level detector that causes the stoppage of HF gas supply in 10:65-11:2 is the claimed an emergency stop of current claim. Alternatively, according to 9:20-

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50 during the halting of electrolysis due to abnormal liquid levels in the anode or cathode chamber, the supply of HF is also stopped, which also corresponds to the claimed an emergency stop of current claim.

Addressing claims 14 and 18, in figure 1, all of the solenoid or automatic valves of Tojo are located above the predetermined level of the liquid surface level of the electrolyte because all of the automatic valves are disposed outside of the electrolytic cell.

Furthermore, Tojo discloses the inert gas inlet 15 is located above the predetermined level of liquid surface level of the electrolyte as well (figure 10).

Kawai discloses the inert gas feed line is connected to the HF feed line in the HF gas supply system (figure 9) outside of the inert gas supply system (figure 9).

Tojo and Kawai are silent regarding the first automatic valve is located above the predetermined level of the liquid surface level of the electrolyte and the inert gas feed line is connected to the HF gas feed line at a location above the predetermined level of the liquid surface level of the electrolyte.

At the time of the invention, one with ordinary skill in the art would have found it obvious to modify the fluorine gas generator of Tojo by disposing the first automatic valve on the HF gas feed line outside of the electrolytic cell 2 or above the predetermined level of the liquid surface level of the electrolyte because there are only two finite locations on the HF gas feed line on which the first automatic valve can be disposed, which is outside or inside of the electrolytic cell; however, it is self evidenced from the disclosure of Tojo that all of the solenoid valves are located outside of the electrolytic

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cell and above the predetermined level of the liquid surface level of the electrolyte; therefore, one would still obtain the predictable result of closing or opening the first automatic valve to control the flow of HF gas by disposing the first automatic valve on the HF gas feed line outside of the electrolytic cell and above the predetermined level of the liquid surface level of the electrolyte and such modification is a matter of obviousness (KSR decision, Rationale E, MPEP 2141). Additionally, one with ordinary skill in the art would have found it obvious to modify the fluorine gas generator of Tojo by connecting the inert gas feed line at a location above the predetermined level of liquid surface level of the electrolyte because there are only two finite locations at which the connection between the inert gas feed line and the HF gas feed line, which is above or below the predetermined level of the liquid surface level; however, as shown in figure 1 of Tojo all of the connections between the inert gas feed line and other feed lines are made above the predetermined level of the liquid surface level; therefore, one would have obtained the predictable result of purging the HF gas feed line on the side downstream of the first automatic valve by connecting the inert gas feed line to the HF gas feed line at a location above the predetermined level of the liquid surface level of the electrolyte and such connection is a matter of obviousness according to the fact that all of the feed line connections of Tojo are made above the predetermined level of the liquid surface level of the electrolyte (Tojo, figure 1, KSR decision, Rationale E, MPEP 2141).

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Addressing claims 15 and 19, Tojo discloses the solenoid or automatic valve 52, 54, 56 and 58 on the inert feed line that are the structural equivalences of the claimed second automatic valve (figure 1).

Kawai also discloses a valve 47 for feeding inert gas to the side downstream from the first valve 45 of the HF gas feed line.

Response to Arguments

6. Applicant's arguments with respect to claims 13-22 have been considered but are moot in view of the new ground(s) of rejection.

Kawai is cited and relied on for the first time in this office action as necessitated by Applicant's amendments to the claims. The only difference between the disclosure of Tojo and that of current claim is the connection between the inert gas feed line and the HF gas feed line at a location downstream from the first automatic valve. The difference is taught by Kawai with connecting the inert gas feed line at a location downstream from the valve that controls the flow of HF gas in order to purge the HF gas feed line of HF gas. Therefore, the limitations of current claims are obvious over the combined disclosures of Tojo in view of Kawai.

Conclusion

7. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

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A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to BACH DINH whose telephone number is (571)270-5118. The examiner can normally be reached on Monday-Friday EST 7:00 A.M-3:30 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Keith Hendricks can be reached on (571)272-1401. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

BD

11/22/2011

/Keith D. Hendricks/

Supervisory Patent Examiner, Art Unit 1724